

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**WETLAND RESTORATION**

(acre)

**CODE 657**

**DEFINITION**

A rehabilitation of a drained or degraded wetland where the soils, hydrology, vegetative community, and biological habitat are returned to the natural condition to the extent practicable.

**PURPOSE**

To restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions that occurred on the disturbed wetland site prior to modification to the extent practicable.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies only to sites with hydric soil which were natural wetlands that have been previously degraded hydrologically and/or vegetatively.

Upon completion of the restoration the site will meet the current NRCS soil, hydrology, and vegetation criteria of a wetland.

This practice is applicable only if natural hydrologic conditions can be approximated by modifying drainage and/or artificial flooding of a duration and frequency similar to natural conditions.

The restoration should approximate wetland classes described in *Classification of Wetlands and Deepwater Habitats of the United States* (see Table 1 - Wetland Classes). A *Hydrogeomorphic Classification of Wetlands* by Brinson may also be consulted.

If the presence of hazardous waste materials in

the sediment or fill is suspected, soil samples will be collected and analyzed for the presence of hazardous waste as defined by local, state, or federal authorities. Sites containing hazardous waste will not be restored under this standard.

This practice does not apply to: Constructed Wetland (656) intended to treat point and non-point sources of water pollution; Wetland Enhancement (659) intended to rehabilitate a degraded wetland where specific functions and/or values are enhanced beyond original conditions; or Wetland Creation (658) intended to create a wetland on a site location which historically was not a wetland, or was formerly a wetland but will be replaced with a wetland type not naturally occurring on the site.

**CRITERIA**

**General Criteria**

The landowner shall obtain necessary local, state, and federal permits that apply before the restoration practices are applied. Texas water rights permits and Clean Water Act Section 401/404 permits may be required.

Establish vegetative buffers on surrounding uplands to reduce the movement of sediment and soluble and sediment-attached substances carried by runoff.

The soil, hydrology and vegetative characteristics existing on the site and the contributing watershed shall be documented before restoration of the site begins.

**Criteria for Hydric Soil Conditions**

Restoration sites will be located on hydric soils

<p>Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.</p>
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**NRCS, TEXAS  
September 2001**

(see FOTG, Section II, hydric soil list, and *Field Indicators of Hydric Soils In The United States*).

If hydric soil is covered by fill, sediment, spoil, or other depositional material, the material covering the hydric soil shall be removed only to the surface of the buried (or original) hydric soil.

Reestablish an approximation of the original soil microtopography where applicable.

#### **Criteria for Hydrology Restoration**

A permanent water supply should be available approximating the needs of the wetlands. The hydrology of the site is defined as the rate, path, and timing of inflow and outflow; duration, frequency, and depth of flooding, ponding or saturation. Refer to Engineering Field Handbook, Chapter 19, *Hydrology Tools for Wetland Determination*.

The maximum hydrology and the overall hydraulic variability of the restored site will approximate the conditions that existed before alteration, e.g., dynamic and static water levels, soil saturation.

The standards and specifications for Dike (356) and Structure for Water Control (587) will be used as appropriate. Refer to the Engineering Field Handbook, Chapters 13, *Wetland Restoration, Enhancement, and Creation*, and 6, *Structures*, for additional design information. Existing drainage systems will be utilized, removed, or modified as needed to achieve the intended purpose.

#### **Criteria for Vegetation Restoration**

The vegetation shall be restored as close to the original natural plant community as the restored site conditions will allow. Determination of the original plant community's species and percent composition shall be based upon reference wetlands of the type being restored or suitable technical reference. Refer to applicable Soils 5 sheets, vegetative site descriptions, and archived aerial photography.

Plantings, seeding, or other types of vegetative establishment will be comprised of native

species that occur on the wetland type being restored.

Preference shall be given to native wetland plants with localized genetic material. Plant materials collected or grown from material collected within a 200 mile radius from the site is considered local.

In soils where seed banks realistically exist, or where natural colonization of selected native species (identified from reference wetlands) will dominate within 5 years, then natural regeneration can be allowed.

Adequate substrate material and site preparation necessary for proper establishment of the selected plant species shall be included in the design.

On sites which were predominantly herbaceous vegetation prior to modification and planting and/or seeding is necessary, the minimum number of native species to be established shall be based upon the wetland classes prior to modification (see Table 1 - Wetland Classes).

Sites restored to only one ecological site shall be established with at least two species adapted to the site. Sites with two or more ecological sites shall be established with at least one native species on each ecological site.

Herbaceous vegetation will be established in accordance with guidance in Range Planting (550) or Conservation Cover (327).

Forested wetland plantings and/or seeding will include a minimum of three tree or shrub species on each ecological site. Tree (and shrub) planting will follow the criteria of Tree Planting (612).

Seed planting rates and site preparation will meet the criteria of Woodland Direct Seeding (652) and Wetland Wildlife Habitat Management . Seed viability will be determined prior to planting.

#### **Criteria for Wetland Functions**

A functional assessment (Hydrogeomorphic Methodology or similar approach) will be performed on the site prior to restoration.

Restoration goals and objectives shall include targeted natural wetland functions for the wetland type and the site location as determined by the functional assessment and reference site data. Wetland functions include flood conveyance, wave barriers, flood storage, sediment control, pollution control, fish and wildlife habitat, recreation (water based) water supply (surface) and aquifer recharge. A post-project assessment will be performed after an adequate period to assess the success of the restoration.

### **CONSIDERATIONS**

Consider effect of volumes and rates of runoff, infiltration, evaporation, and transpiration on the water budget.

Evaluate the potential for a change in rates of plant growth and transpiration because of changes in the volume of available soil water.

Consider effects on downstream flows or aquifers that would affect other water uses or users.

Consider effects on wetlands or water-related resources wildlife habitats that would be associated with the practice.

Consider as a high priority those sites adjacent to existing wetlands as they increase wetland system complexity and diversity, decrease habitat fragmentation, and ensure colonization of the site by wetland flora and fauna.

Consider linking wetlands by corridors wherever appropriate to enhance the wetland's use and colonization by the flora and fauna.

Consider the effects of varying water levels in response to potential climatic events such as wet or dry periods.

Consider changes in salt movement / concentrations in the soil resulting from hydrologic alterations.

The nutrient and pesticide tolerance of the plant species planned should be considered where known nutrient and pesticide contamination exists.

Consider effects of temperature on water resources to prevent undesired effects on aquatic and wildlife communities.

For discharge wetlands, consider upslope water/groundwater source availability.

### **PLANS AND SPECIFICATIONS**

Specifications for this practice shall be prepared for each site. Specifications shall be recorded using approved specifications sheets, job sheets, narrative statements in the conservation plan, or other documentation. Requirements for the operation and maintenance of the practice shall be incorporated into site specifications.

### **OPERATION AND MAINTENANCE**

The following actions shall be carried out to insure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance):

Any use of fertilizers, mechanical treatments, prescribed burning, pesticides and other chemicals to assure the wetland restoration function shall not compromise the intended purpose;

Biological control of undesirable plant species and pests (e.g., using predator or parasitic species) shall be implemented where available and feasible;

Timing and level setting of water control structures required for the establishment of desired hydrologic conditions or for management of vegetation;

Inspection schedule for embankments and structures for damage assessment;

Depth of sediment accumulation to be allowed before removal is required;

Management needed to maintain vegetation, including control of unwanted vegetation;

Haying and livestock grazing plans will be developed so as to allow the establishment, development, and management of wetland and associated upland vegetation.

#### REFERENCES

\_\_\_\_\_. 1998. Field Indicators of hydric soils in the United States, a guide for identifying and delineating hydric soils. USDA-NRCS.

\_\_\_\_\_. 1997. Hydrology tools for wetland determination. USDA-NRCS Engineering Field Handbook, Chapter 19.

\_\_\_\_\_. 1992. Wetland restoration, enhancement, and creation." USDA-NRCS Engineering Field Handbook, Chapter 13. 79 pp.

\_\_\_\_\_. 1980. Structures. USDA-NRCS Engineering Field Handbook, Chapter 6.

Allen, J.A., 1997. Reforestation of bottomland hardwoods and the issue of woody species diversity. Restoration Ecology 5(2): 125-134.

Bazzaz, F.A., 1975. Plant species diversity in old-field successional systems in southern Illinois. Ecology 56: 485-488.

Brinson, M.M. 1993. A Hydrogeomorphic classification for wetlands. Technical Report WRP-DE-4, Army Engineers Waterways Experiment Station, Vicksburg, MS.

Cowardin, L.M. et. al. 1979. Classification of wetlands and deepwater habitats of the United States. USDI-FWS. 131 pp.

Hammer, D.A., 1992. Creating freshwater wetlands. Lewis publishers, Inc., Chelsea, MI. 298 pp.

Mitsch, J.W. and J.G. Grosselink, 1993. Wetlands, 2nd edition. Van Nostrand Reinhold, NY. 722 pp.

Kusler, J.A. 1984. Our national wetland heritage, a protection guide book. Environmental Law Institute, Washington, D.C. 167 pp.

#### APPROVAL

\_\_\_\_\_/s Gary Valentine

State Wildlife Biologist

\_\_\_\_\_  
September 18 2001

Date

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FOTG.

\_\_\_\_\_  
Natural Resource Manager

\_\_\_\_\_  
Date

#### STATEMENT OF NEED

This practice is needed in the

**NRCS, TEXAS**  
**September 2001**

#### CERTIFICATION

Reviewed and determined adequate without  
need of revision:

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Zone Wildlife Biologist

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Date

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Zone Wildlife Biologist

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Date

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Zone Wildlife Biologist

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Date

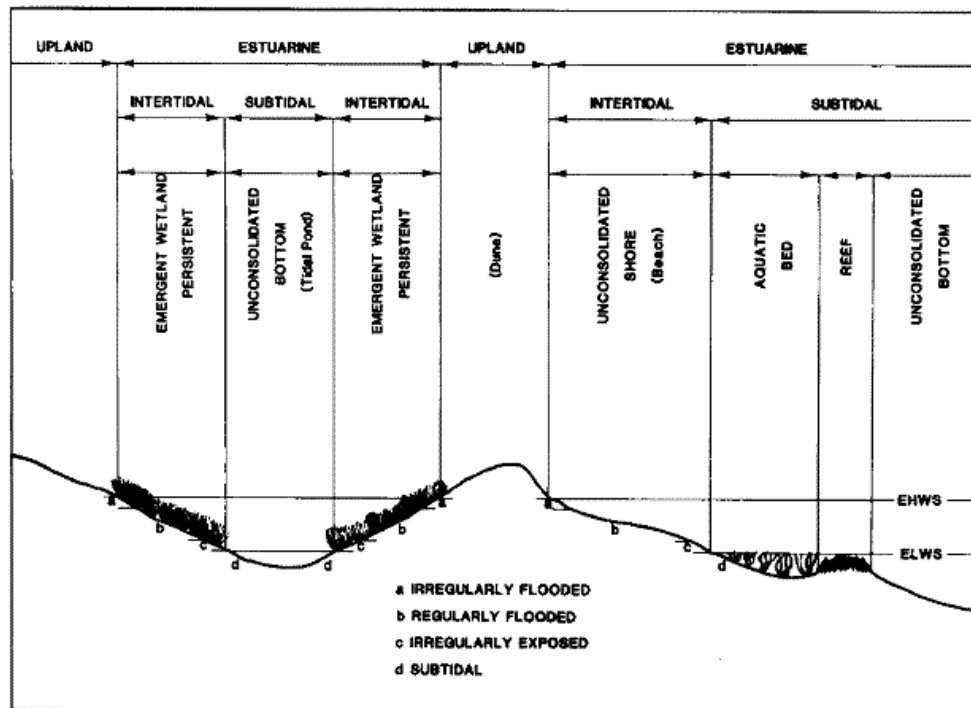
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Zone Wildlife Biologist

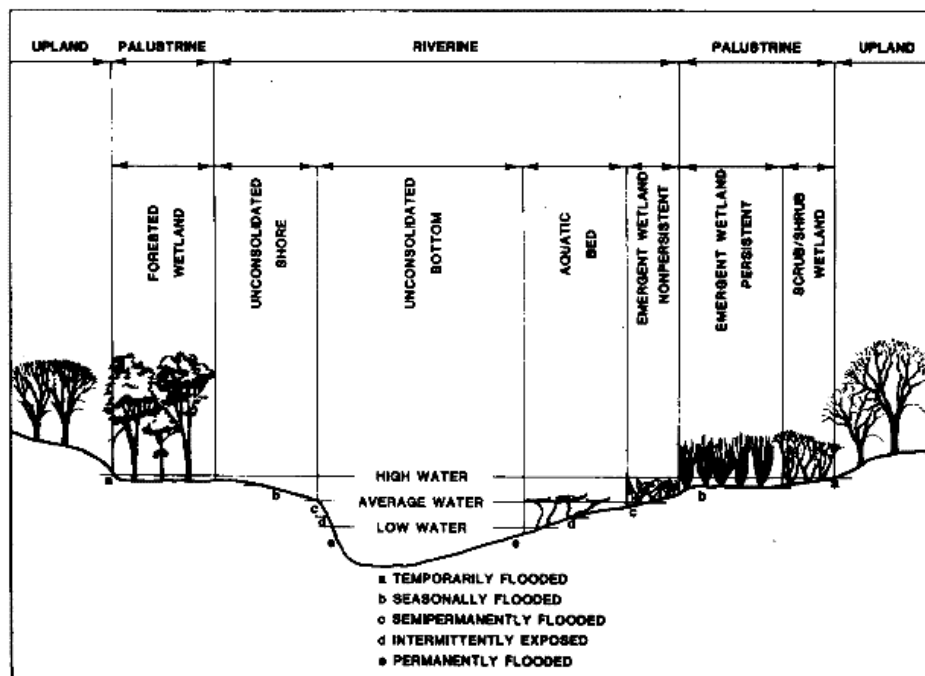
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Date

## WETLAND CLASSIFICATION (Table 1)

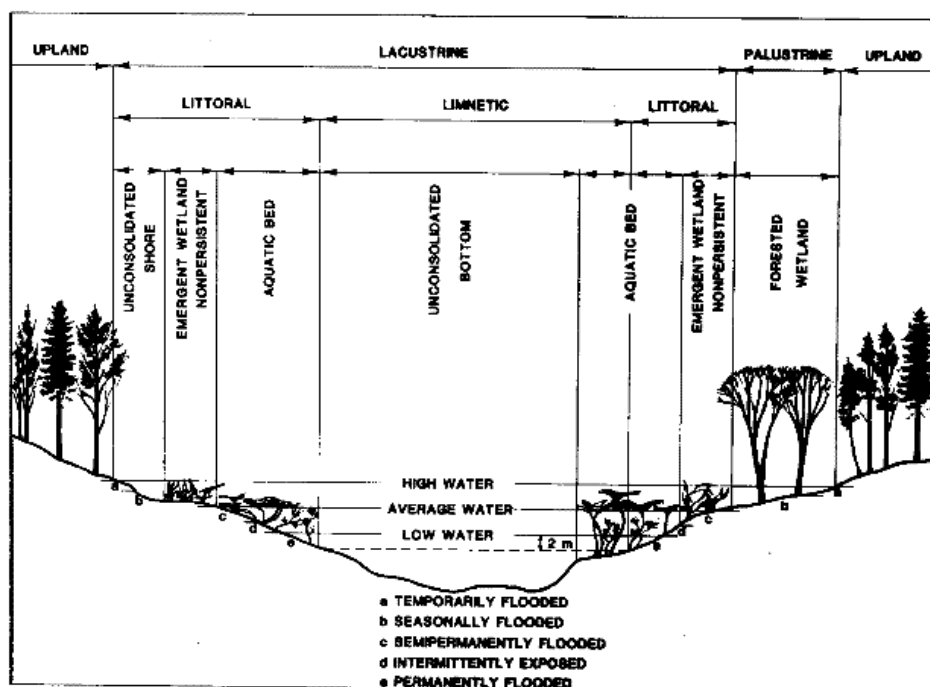


Distinguishing features and examples of habitats in the Estuarine System. EHWS - extreme high water of spring tides; ELWS - extreme low water of spring tides.

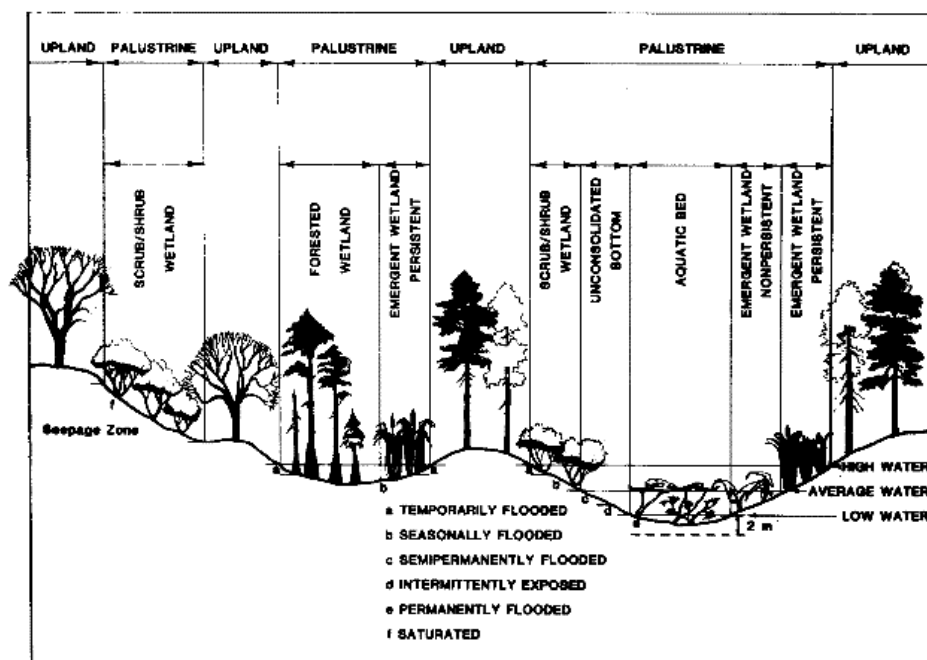


Distinguishing features and examples of habitats in the Riverine System.

(Table 2 Cont.)



Distinguishing features and examples of habitats in the Lacustrine System.



Distinguishing features and examples of habitats in the Palustrine System.

(Excerpts from USFWS' *Classification of Wetlands and Deepwater Habitats of The United States*)